

Application of income valuation methods: Value spread vs. net income

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Abstract

The issues preceding the process of company valuation via income valuation methods are explored in this paper. Income valuation methods are applicable only if particular requirements are fulfilled. The fulfilment of some of these requirements can be verified by the application of two selected variables: the value spread and the net income. The aim in this paper is to examine the dependence between these two variables in Czech agricultural companies using the chi-square test of independence. Based on empirical tests, it is proved that there is slightly positive dependence between these variables and that the value spread and net income are appropriate for the identification of suitable companies for the application of income valuation methods.

Keywords

Agricultural company, company value, income valuation, net income, value spread.

JEL Classification: G32, Q13

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1. Introduction

The magnitude of company value measurement by various methods based on the net present value principle has been explored by a large body of literature (Damodaran, 2007; Koller et al., 2010; Plenborg, 2002). This principle applied to company valuation is derived from the dividend discount model (DDM) originally dedicated to the valuation of stocks (Brealey et al., 2007). Despite the broad use of the income valuation methods, their applicability is closely connected with the company's future perspective, the so-called going concern principle. If it cannot be assumed that a company will remain viable and active in the future, the income valuation methods are not applicable.

The overall process of company valuation via the income valuation methods is rather complex and extensive, the calculation including various sub-calculations. Therefore, it might be useful to know in advance whether the income method requirements are met and thus the method is applicable to a specific company. These requirements are:

- the aforementioned going concern principle,
- the continuous competitiveness of the company,
- the growth potential of the industry and
- the ability of the company to meet its liabilities in due time.

According to Mařík (2007), the going concern principle is met if a positive cash flow can be expected in the long term. There is the possibility to examine the fulfilment of some of these requirements via the so-called value spread (Cassia and Vismara, 2009; Mařík, 2007). The value spread is the difference between return on equity and costs of equity ($ROE - r_e$), which serves as a basis for the economic value added (EVA) calculation (Dluhošová, 2004):

$$EVA = (ROE - r_e) \cdot E, \quad (1)$$

where EVA is the economic value added, ROE is the return on equity, r_e is the costs of equity and E is the equity. Any value creation in a company is closely related to the relation between the rates of return obtained (ROE) and those expected (r_e) (Mařík, 2007).

Moreover, the value spread provides information about the company's overall financial success. The

success or failure can be easily identified based on the size of the spread, by the percentage by which the return on equity is higher/lower than the costs of equity. In order to provide the information in monetary units, the difference can be multiplied by the equity. The multiplication of the value spread by the shareholders' equity means the economic profit generated within the year by the company (Neumaierová et al., 2005). Therefore, the spread serves as a direct verification tool for the applicability of the income valuation method.

In this paper, the value spread criterion is challenged by the traditional economic tool: the book profit/loss, i.e. earnings after taxation (EAT). Even though this indicator is still widely used and connotes the overall economic prosperity of a company, its validity as an economic performance indicator is rather arguable.

The EAT of a company is calculated as the sum of all the relevant expenses deducted from the sales realized. The important part of the expenses is created by the costs of goods sold (COGS). The EAT can be considered as the net income (NI) or profit/loss for the year. However, generating a positive EAT does not necessarily mean showing adequate economic performance, not only due to the different accounting policies, but also due to the extraordinary company activities (Kislingerová, 2001). In addition, the EAT provides only the information from the current year, and uses nominal or historical prices. Therefore, it is easily interpreted and easily accessible from the publicly issued financial statements of a company. Companies can also be compared based on the EAT; however, there is a need for a respective system of peer group clustering according to, for example, the range of economic activities, provided services and total economic size of all the participants via the employment of the relevant indicator.

It can be easily assumed that a company generating profit surely creates value for its owners and, vice versa, a company with a loss will definitely destroy its value. This does not have to be the case. There can be companies with a net income that can be shielded by various factors and therefore it cannot provide an indication about the value creation.

The public subsidies in the agricultural sector can be an illuminating example of the shielding of companies' net income. In particular, the operating subsidies as part of the operating revenues have a direct effect on the profit or loss of the company. As a consequence, the net income may refer to an optimistic economic situation and the possibility of smooth application of the income valuation framework. However, since the value spread is part of the income valuation formula (Dluhošová, 2004; Plenborg, 2002), there is a need to focus on the spread itself when assessing the applicability of the income valuation framework. On the other hand, all the companies in the agricultural sector can still be objects for the substantial valuation or application of the so-called asset valuation framework.

Contained in this paper is an investigation into whether or not Czech agricultural companies create value using the value spread between the companies' return on equity and their costs of equity in 2009. Furthermore, the independence of the value spread and accounting net income is verified via the chi-square test of independence, and if dependence is detected, the Cramer's V coefficient is employed. The following hypothesis is tested:

H_0 : *Creating/destroying value according to the value spread method does not depend on the net income within the observed sample.*

The objective of this paper is to examine the dependence between the value spread and the net income of Czech agricultural companies.

The findings of this paper may be used for the process of company valuation, namely for the pre-selection of suitable valuation objects, since the income valuation methods cannot be applied widely.

2. Data and methodology

The sample used in this paper consists of all the active Czech agricultural companies listed in the corporate database of Bureau van Dijk (Amadeus). The Amadeus database provides comprehensive financial information on millions of European companies. The data are standardized and collected by national agencies.

For the purposes of this paper, cross-sectional analysis is employed: the year 2009 is selected together with 1761 companies from the agricultural sector (CZ NACE 01, excluding hunting – 01.7). For each company, the following variables are calculated as follows:

Return on equity is calculated as the profit (loss) for the period divided by the shareholders' equity, expressed as a percentage (i.e. multiplied by 100).

The costs of equity are estimated via building up the INFA model as a heuristic model that determines the costs of equity as the sum of the risk-free rate and individually estimated risk premiums specific to a particular company (Kolouchová and Novák, 2010; Neumaierová et al., 2005):

$$r_e = r_f + r_{LA} + r_{POD} + r_{FINSTAB} + r_{FINSTRU}, \quad (2)$$

in which all r s stand for additional risks associated with the company size, business risk, financial stability and financial structure, respectively.

The net income is the profit (loss) for the year, also known as earnings after taxation (EAT).

The value spread is calculated as the difference between return on equity and costs of equity. If the return is higher than the costs, new value is created; if the return is lower, value is destroyed.

To verify the value creation of Czech agricultural companies, the value spread is calculated for each individual company within the sample.

The chi-square test of independence is used to investigate the independence between the value spread and the net income of each company. Both variables are categorical: value is created/is not created and net income is positive (profit)/negative (loss). The general chi-square test of independence framework by Hendl (2009) is used, as provided below:

$$\chi^2 = \sum \frac{(O-E)^2}{E}, \quad (3)$$

where O stands for the observed frequency, E stands for the expected frequency, asserted by the null hypothesis, and χ^2 is the Pearson's test statistic, which can be compared with a critical value with degrees of freedom on a given significance level. The degrees of freedom (df) can be calculated as a number of categories in the table $r \times s$: $(r-1) \times (s-1)$. The tables are called contingency tables. If the test statistic is higher than the critical value, the hypothesis is rejected. In the case that the hypothesis is rejected, the dependence is further examined by other coefficients, for example the Cramer's V coefficient:

$$V = \sqrt{\frac{\chi^2}{n(m-1)}}, \quad (4)$$

in which V is the Cramer's V coefficient, n the total number of cases and m the higher number of total rows or columns. The Cramer's V coefficient is within the scope of $(0, 1)$; when the coefficient is equal to zero, there is no dependence; if the coefficient is 1, there is a strong relation between the selected variables.

The independence test is given at the 5% level of significance (P value = 0.05).

3. Results and discussion

Table 1 presents the results of the selected variables among Czech agricultural companies in 2009.

Table 1 Number of companies according to their net income and value spread (source: own calculation)

Variables	Description	Absolute frequency	Relative frequency
Profit	$Net\ income > 0$	1009	57 %
Loss	$Net\ income < 0$	752	43 %
Total		1761	100 %
Positive value spread	$ROE - r_e > 0$	385	22 %
Negative value spread	$ROE - r_e < 0$	1376	78 %
Total		1761	100 %

According to the findings, it appears that while profit-generating companies prevail, companies creating value for their owners with an ROE (obtained returns) higher than r_e (expected returns) are rather rare, accounting for only 22% of the sample. Therefore, among the profit-generating companies there need to be some companies destroying their value, i.e. with a negative value spread.

For the value spread and net income independence test, a contingency table (Table 2) is provided. Each row presents the relative frequency of companies firstly with a positive and secondly with a negative value spread according to the company's net income; for example, only 18% of companies have a positive value spread and generate profit at the same time and 39% still generate profit but have a negative value spread. At the end of each row, the total relative frequency is shown in bold. Analogically, each column provides the relative frequency of the companies according to their profit/loss, and at the end, the total relative frequency for the value spread (positive/negative) is shown.

Table 2 Selected variables and their relative frequencies in the contingency table (source: own calculation)

	Positive value spread	Negative value spread	TOTAL
Profit	18 %	39 %	57 %
Loss	4 %	39 %	43 %
TOTAL	22 %	78 %	100 %

There are also companies that report a loss but have a positive value spread. However, they only constitute 4% of the sample. Companies with a loss have a rather negative value spread: 39% of the sample. The optimistic perspective is that there are more profit-making companies (57%) than loss-making ones (43%). On the contrary, 78% of companies in the sample do not cover their costs of equity by

returns on equity: they represent a negative value spread. These facts lead to the conclusion that the EAT perspective provides misleading information about the economic performance of agricultural enterprises: profit-generating companies do not cover their costs of equity capital with the returns on this equity (in 39% of cases). To verify the relation between those two criteria (value spread and net income), the chi-square test of independence is employed (Table 3).

Table 3 Results of the chi-square test of independence and Cramer's V coefficient (source: own calculation)

Pearson Chi-Square (test statistic)	149.504
Degrees of freedom (df)	1
Critical value	3.841
Significance level of the test	5 %
Cramer's V coefficient	0.291

According to the results of the chi-square independence test (and critical value approach), the hypothesis about independence – *Creating/destroying value according to the value spread method does not depend on the net income within the observed sample* – can be rejected at the given significance level.

Therefore, it can be said that creating/destroying value (the value spread approach) depends on the net income – profit or loss – within the observed sample. Since creating value according to the value spread is not independent of the net income, a symmetric measure (Cramer's V coefficient) is employed. Based on the coefficient, the dependence between the variables is slightly positive.

The slightly positive dependence may confirm the fact that in agriculture, the return ratios are often very low (Kopta and Maršík, 2009) and therefore cannot cover the costs of equity, which are estimated via the INFA method, which uses a risk premium for each individual company. This risk premium is rather high, due the specifics of agricultural companies. Moreover, Štřelček et al. (2007) identified an important characteristic of Czech agricultural companies: increasing dependence of public subsidies on net incomes, which can be considered as above-average compared with the EU-15. Therefore, the EAT can be partly shielded by these subsidies.

It can be recommended that for a smooth application of the income valuation framework, there needs to be a positive value spread by the particular valuation object. In other words, to improve the unfavourable economic situation of the companies in the agricultural sector, the returns on companies' equity need to be improved and the costs of equity, or more precisely the additional risks creating with the risk-free rate the costs of equity, need to be optimized (see eq. 2).

In order to deal with these aspects there are several possibilities, for example enhancing the initiatives for the horizontal integration of agricultural companies. It was proved by Wolz et al. (2006) that the ability of agricultural companies to cooperate horizontally positively influences the net incomes of these companies, especially in terms of collective bargaining for the prices of inputs. As a consequence of improving the companies' EAT, the overall financial situation is improved, too.

As mentioned above, if the income valuation methods are employed, there is a need to identify in advance the valuation objects fulfilling the income valuation requirements. Considering the selected variables, the net income and the value spread, as proper indicators of applicability, these indicators highlight 18% of companies with a positive value spread and net income, which are therefore suitable for the application of income valuation methods. Each indicator individually highlights 22% and 57%, respectively. Therefore, if those two indicators are considered together, they provide more precise information about the applicability of the income valuation methods (Table 2). The 18% of companies can be a suitable sample for smooth application of the income valuation methods, for example the method based on economic value added or residual income (Plenborg, 2002).

4. Conclusion

Overall, the picture that emerges from Czech agricultural companies is consistent with the findings of Kopta and Maršík (2009). There is confirmation that the value spread is positive only in 22% of cases: only 22% of the sample reports a higher return on equity than costs of equity capital. This fact may be caused by agricultural specifics, as outlined by Střeleček et al. (2007). Whereas the net income indicates a greater percentage of companies being profitable, according to the value spread, the majority of companies report a negative difference between obtained and expected returns (Table 1). Additionally, there is evidence that companies that create value do not have to generate a profit, or, analogically, companies that destroy their value do not have to report a loss (Table 2).

For the verification of the relation between those two criteria (value spread and net income), the chi-square test of independence was employed to accept or reject the null hypothesis: *Creating/destroying value according to the value spread method does not depend on the net income within the observed sample*. At the given significance level, the hypothesis was rejected and an alternative hypothesis was accepted: it can be said that creating/destroying value depends on the net income, within the observed sample. Based on

Cramer's V coefficient, the dependence is slightly positive (Table 3).

Both the net income and the value spread serve as proper indicators for the verification of the applicability of income valuation methods, since the value spread is a direct part of the income value calculation (Dluhošová, 2004; Kislingerová, 2001). If a company does not create value, i.e. does not cover its costs of equity with its return on equity, the income valuation methods are not applicable, or the resultant income value may provide misleading information. These application obstacles are prevented by the verification of fulfilment of the income valuation method requirements. Both the net income and the value spread collectively provide information on whether or not the income methods are applicable. In contrast, the net income individually identified 57% of companies and the value spread individually identified 22% of companies, but they collectively identified 18% of the sample (Table 2). These two indicators collectively defined companies with a positive net income and value spread, which are therefore suitable objects for income valuation method application. Finally, despite the individual limitations of these indicators, collectively they can provide more precise information about the sub-sample of objects, which are suitable for income valuation.

On the other hand, there is still a limitation regarding time, since this research was conducted for one year only. This limitation is slightly compensated for by the sample size, 1761 Czech agricultural companies.

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